AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Original) A method of inducing differentiation of a non-cardiomyocyte into a cardiomyocyte, said method comprising stimulating oxytocin receptor (OTR) activity in said non-cardiomyocyte.

2. (Original) The method of claim 1, wherein said method comprises contacting said non-cardiomyocyte with an agent capable of stimulating OTR activity.

3. (Original) The method of claim 2, wherein said agent is selected from the group consisting of oxytocin or a functional derivative thereof, retinoic acid and triiodothyronine (T_3).

4. (Previously presented) The method of claim 3, wherein said oxytocin or functional derivative thereof has the structure:

Cys-Tyr-Ile-Gln-Asn-Cys-Pro-Leu-Gly-CO-R (SEQ ID NO: 17)

wherein R is selected from the group consisting of OH, NH_2, Gly, Gly-Lys and Gly-Lys-Arg.

5. (Original) The method of claim 1, wherein the method comprises introducing into the non-cardiomyocyte a nucleic acid capable of encoding oxytocin or an oxytocin-related compound.

6. (Original) The method of claim 5, wherein the nucleic acid is selected from the group consisting of:

(a) SEQ ID NO: 5;

(b) a nucleic acid sequence capable of encoding SEQ ID NO: 6; and

(c) a nucleic acid sequence substantially identical to (a) or (b).

7. (Original) The method of claim 1, wherein said non-cardiomyocyte is a stem or progenitor cell.

8. (Original) The method of claim 7, wherein said stem or progenitor cell is selected from the group consisting of embryonic and adult stem or progenitor cells.

9. (Original) The method of claim 7, wherein said stem or progenitor cell is selected from the group consisting of circulating and non-circulating stem or progenitor cells.

10. (Original) The method of claim 7, wherein said method is performed *in vitro*.

11. (Original) The method of claim 7, wherein said method is performed *in vivo*.

12. (Original) The method of claim 1, wherein said cardiomyocyte is characterized by an alteration of a phenotypic feature relative to said non-cardiomyocyte, wherein said phenotypic feature is selected from the group consisting of:

(a) level of oxytocin receptor (OTR) protein or OTR-encoding nucleic acid;

(b) level of ANP protein or ANP-encoding nucleic acid;

(c) level of muscular MHC protein or muscular MHC-encoding nucleic acid;

(d) level of DHPR-alpha1 protein or DHPR-alpha1-encoding nucleic acid;

(e) level of sarcomeric marker proteins;

(f) level of ion channels;

(g) mitochondrial dye retention;

(h) appearance of rhythmic beats; and

(i) chronotropic responses.

13. (Original) A method of treating a disease characterized by cardiomyocyte loss or deficiency in an animal, said method comprising stimulating oxytocin receptor (OTR) activity in a non-cardiomyocyte cell of said animal.

14. (Original) The method of claim 13, wherein said method comprises administering an agent capable of stimulating OTR activity to said animal.

15. (Original) The method of claim 14, wherein said agent is selected from the group consisting of oxytocin or a functional derivative thereof, retinoic acid and triiodothyronine (T_3).

16. (Previously presented) The method of claim 15, wherein said oxytocin or functional derivative thereof has the structure:

Cys-Tyr-Ile-Gln-Asn-Cys-Pro-Leu-Gly-CO-R (SEQ ID NO: 17)

wherein R is selected from the group consisting of OH, NH_2, Gly, Gly-Lys and Gly-Lys-Arg.

17. (Original) The method of claim 15, wherein the method comprises administering a nucleic acid capable of encoding oxytocin or a functional derivative thereof to said animal.

18. (Original) The method of claim 17, wherein the nucleic acid is selected from the group consisting of:

(a) SEQ ID NO: 5;

(b) a nucleic acid sequence capable of encoding SEQ ID NO: 6; and

(c) a nucleic acid sequence substantially identical to (a) or (b).

19. (Original) The method of claim 13, wherein said non-cardiomyocyte is a stem or progenitor cell.

20. (Original) The method of claim 19, wherein said stem or progenitor cell is selected from the group consisting of circulating and non-circulating stem or progenitor cells.

21. (Original) The method of claim 13, wherein said animal is a mammal.

22. (Original) The method of claim 13, wherein said animal is a human.

23. (Original) The method of claim 13, wherein said disease is selected from the group consisting of cardiac congenital dysfunctions, aging-related heart pathologies, heart infarction, congestive heart failure and acute myocardial ischemia.

24. (Original) A method of treating a disease characterized by cardiomyocyte loss or deficiency in an animal, said method comprising:

(a) inducing, using the method of claim 1, differentiation of a non-cardiomyocyte cell into a cardiomyocyte; and

(b) implanting said cardiomyocyte into said animal.

25. (Original) The method of claim 24, wherein said animal is a mammal.

26. (Original) The method of claim 24, wherein said animal is a human.

27. (Original) The method of claim 24 where said disease is selected from the group consisting of cardiac congenital dysfunctions, aging-related heart pathologies, heart infarction, congestive heart failure and acute myocardial ischemia.

28. (Original) The method of claim 24, wherein said method comprises contacting said non-cardiomyocyte with an agent capable of stimulating OTR activity.

29. (Original) The method of claim 28, wherein said agent is selected from the group consisting of oxytocin or a functional derivative thereof, retinoic acid and triiodothyronine (T_3).

30. (Previously presented) The method of claim 29, wherein said oxytocin or functional derivative thereof has the structure:

Cys-Tyr-Ile-Gln-Asn-Cys-Pro-Leu-Gly-CO-R (SEQ ID NO: 17)

wherein R is selected from the group consisting of OH, NH_2, Gly, Gly-Lys and Gly-Lys-Arg.

31. (Original) The method of claim 24, wherein the method comprises introducing into the non-cardiomyocyte a nucleic acid capable of encoding oxytocin or a functional derivative thereof.

32. (Original) The method of claim 31, wherein the nucleic acid is selected from the group consisting of:

(a) SEQ ID NO: 5;

(b) a nucleic acid sequence capable of encoding SEQ ID NO: 6; and

(c) a nucleic acid sequence substantially identical to (a) or (b).

33. (Original) The method of claim 24, wherein said non-cardiomyocyte is a stem or progenitor cell.

34. (Original) The method of claim 33, wherein said stem or progenitor cell is selected from the group consisting of embryonic and adult stem or progenitor cells.

35. (Original) The method of claim 33, wherein said stem or progenitor cell is selected from the group consisting of circulating and non-circulating stem or progenitor cells.

36. (Original) The method of claim 24, wherein said non-cardiomyocyte is autologous to said animal.

37. (Original) The method of claim 36, said method further comprising obtaining said non-cardiomyocyte from said animal prior to inducing said differentiation.

38. (Original) The method of claim 24, wherein said non-cardiomyocyte is non-autologous to said animal.

39. (Original) The method of claim 38, wherein said non-cardiomyocyte is allogenic to said animal.

40. (Original) The method of claim 38, wherein said non-cardiomyocyte is xenogenic to said animal.

41. (Original) The method of claim 24, wherein said cardiomyocyte is characterized by an alteration of a phenotypic feature relative to said non-cardiomyocyte, wherein said phenotypic feature is selected from the group consisting of:

(a) level of oxytocin receptor (OTR) protein or OTR-encoding nucleic acid;

(b) level of ANP protein or ANP-encoding nucleic acid;

(c) level of muscular MHC protein or muscular MHC-encoding nucleic acid;

(d) level of DHPR-alpha1 protein or DHPR-alpha1-encoding nucleic acid;

(e) level of sarcomeric marker proteins;

(f) level of ion channels;

(g) mitochondrial dye retention;

(h) appearance of rhythmic beats; and

(i) chronotropic responses.

42 to 69. (Canceled)